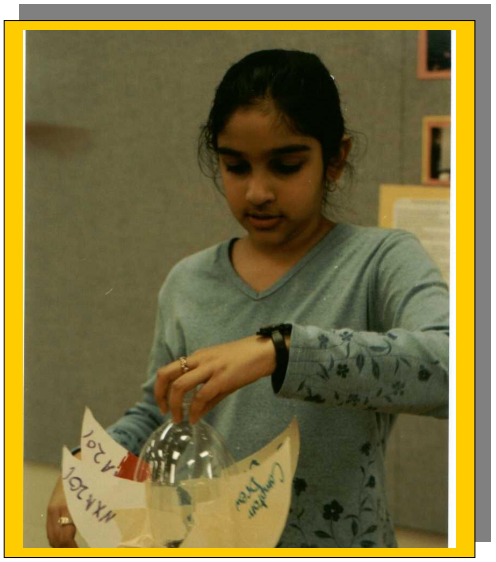
Dynamic Design: Launch and Propulsion

Investigating Fin Shape or Size

STUDENT ACTIVITY

PROCEDURE



Fin Shape

Problem: Which fin shape is the most stable? Remember; right now you are testing for fin shape. All other variables (including fin size, fin number, and fin placement) should remain constant.

Background: From the Web resources in the bibliography, and from any other resources you have, find some information on fin shape and make notes below.

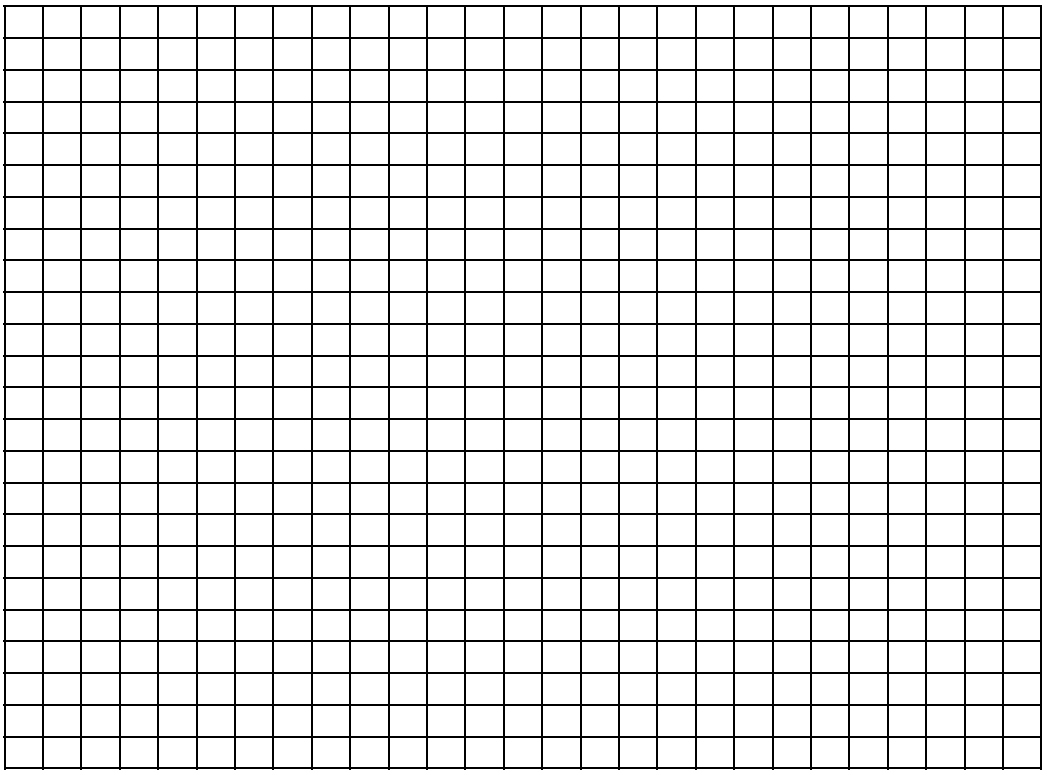
Procedure:

1. Using tag board, design several shapes of fins that could be attached to a paper towel tube. The fins should be the same size but different shapes.
2. Make 3-4 fins of each shape that you designed.
3. Construct a simple rocket using the paper towel tube without a nosecone covering and use tape to attach the fins you have designed.
4. Draw a diagram of your fin shape on your data table.
5. Put your rocket on the ground so it faces a leaf blower or vacuum cleaner. Direct the air from the leaf blower or vacuum cleaner toward the rocket. Turn on the blower until the rocket starts moving.
6. “Launch” your rocket three times, recording each of the three distances on the data table.
7. Determine the average distance and record it.
8. Record any other observations on the data table.
9. Complete the same procedure with at least two other fin shapes.
10. Graph your results.
11. Write your conclusions based on your data.

Data:

Diagram of Fin Shape	Trial 1 Distance (cm)	Trial 2 Distance (cm)	Trial 3 Distance (cm)	Average Distance (cm)	Flight Observations

Results:
(Graph Distance vs. Fin Shape)



Conclusion: What did you determine about fin shape from your activities? Support your conclusions with specific data.

Fin Size

Problem: Which fin size is the most stable? Remember that right now you are testing for fin size; all other variables (including fin shape, fin number and fin placement) should remain constant.

Background: Research information on fin size and make notes. You can use the Web sites in the bibliography or other resources that you may have available.

What sizes of fins will you test?

Procedure:

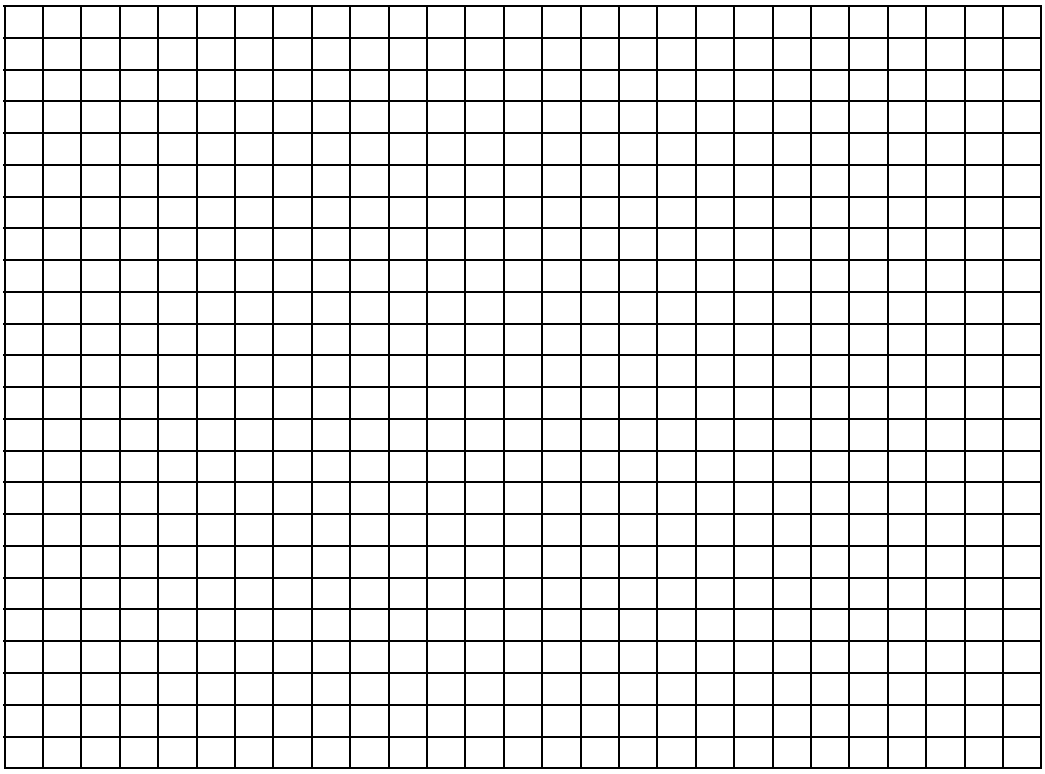
1. Using tag board, design several fins of different sizes that could be attached to a paper towel tube. The fins should be the same shape but different sizes.
2. Make 3-4 fins of each size that you designed.
3. Construct a simple rocket using the paper towel tube and a nosecone covering, and attach the fins you have designed.
4. Trace your fin size on your data table.
5. Put your rocket on the ground so it faces a leaf blower or vacuum cleaner. Direct the air from the leaf blower or vacuum cleaner toward the rocket. Turn on the blower until the rocket starts moving.
6. “Launch” your rocket three times, recording each of the three distances on the data table.
7. Determine the average distance and record it.
8. Record any other observations on the data table.
9. Complete the same procedure with at least two other fin sizes.
10. Graph your results.
11. Write your conclusions based on your data.

Data:

Diagram of Fin Size	Trial 1 Distance (cm)	Trial 2 Distance (cm)	Trial 3 Distance (cm)	Average Distance (cm)	Flight Observations

Results:

(Graph Distance vs. Fin Size)



Conclusion: What did you find is the optimum fin size for stable flight? Support your conclusions with specific data from your activity.